



TMGE Automation Systems

### **Introduction**

TM GE Automation Systems provides plant owners and operators energy analyses of plant systems to allow them to evaluate potential savings by the use of drive and control technology. To perform such studies, it is necessary to have accurate data describing the present system[s] to be studied. In the brief notes below, these data requirements are described and the impact of the data is explained.

### **Data Accuracy and Content**

The more accurate and specific the supplied site data is, the more certain the results of the study will be. For example, if a fan system is described with

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- Type description of the present flow regulation system, such as inlet guide vanes, outlet damper, fluid coupling, eddy current coupling, etc.
- Motor data, including nameplate and manufacturer's performance data
- Fan data with specific test points in the site system
- Time vs air-flow [no boiler steam flow] data, either as tabulations for point-by point analysis or as percent of time vs airflow with corresponding motor ampere or kW for each operating condition
- Hours of yearly or monthly operation
- Energy costs to be used for study, including both kWh and demand charges.

then that system can be analyzed fairly accurately and the results can be used with confidence to predict cost-benefits of any proposed changes.

If general data is provided, or data is not available, missing, or assumes values for some of the definitions above, then the results will be general and less accurate. In the worst case, the results of an analysis could predict significantly more could be saved than would be realized when attempting to do verification after installation.

### **Data Requirements**

Various systems including motors, fans, pumps, drives, mechanical flow controls each have specific components and characteristics that define their operation. Saving energy by the use of technology usually involves the application of ASDs [Adjustable Speed Drives] and may also include various control systems such as PLCs, etc for demand and sequence control.

Typical data needed for each type of site system can be entered into the spreadsheet Energy-Study-Data-Inputs-1.xls. This sheet lists not only the input data required, but ranks them in terms of importance for study accuracy and confidence. This input sheet can be found as a library item at the link below:

[www.tmge.com](http://www.tmge.com)



**PUMP SYSTEM**

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Required **[R]** or desirable **[D]** input data for Pump system VFD payback analysis

Rev 04-14-05

R	Motor Horsepower						
R	Motor NP Volts						
D	Motor NP Efficiency [if avail]						
D	Motor NP Power Factor [if avail]						
R	Motor NP Amps						
	Type of flow control today [select one]						
R	Flow Restricting Valve?	<input checked="" type="radio"/>					
R	Recirculating Valve	<input type="radio"/>					
R	Other [Name] ?	<input type="radio"/>					
R	Energy Cost in \$ / kWh	\$0.05					
<b>Present Operating data</b>							
	Total Operating Hours per year	R					
			Max	Operating point 2	Operating point 3 [if used]	Operating point 4 [if used]	Operating point 5 [if used]
	Pump Flow GPM or Valve % of 100% [requires Valve % vs flow curve in addition]	R	R	R	R	R	
	Head in PSI or Feet of Water Pressure	R	R	R	R	R	
	Motor Power [kw] at operating point flow	D	D	D	D	D	
	<b>OR</b> Motor Amps at operating point Flow	R	R	R	R	R	
	% Time at operating point Flow <b>OR</b> hours at operating point	R	R	R	R	R	
	Pump Curve of RPM vs Shaft Power Available? [y/n]	D	[If yes, please provide]				
	System flow vs pressure curve available [y/n]	D	[If yes, please provide]				



**FAN SYSTEM**

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Required **[R]** or desirable **[D]** input data for fan system VFD payback analysis

Rev 05-12-05

<b>D</b>	Type of Fan System	<input checked="" type="radio"/> Fan [Other] <input type="radio"/> ID Fan <input type="radio"/> DF Fan					
<b>R</b>	Motor Horsepower						
<b>R</b>	Motor NP Volts						
<b>D</b>	Motor NP Efficiency [if avail]						
<b>D</b>	Motor NP Power Factor [if avail]						
<b>R</b>	Motor NP Amps						
	Type of flow control today [select one]						
<b>R</b>	Inlet Guide Vanes?	<input checked="" type="checkbox"/>					
<b>R</b>	Outlet Damper ?	<input checked="" type="checkbox"/>					
<b>R</b>	Other [Name] ?	<input checked="" type="checkbox"/>					
<b>R</b>	Energy Cost in \$ / kWh	\$0.05					
<b>Present Operating data</b>							
	Total Operating Hours per year	<b>R</b>					
			Max	Operating point 2	Operating point 3 [if used]	Operating point 4 [if used]	Operating point 5 [if used]
	Airflow CFM or damper % of 100% [requires damper % vs airflow curve in addition]	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>
	Motor Power [kw] at operating point flow	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>
	OR Motor Amps at operating point Flow	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>
	% Time at operating point Flow or hours at point	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>	<b>R</b>
	Fan Curve of RPM vs Shaft Power Available? [y/n]	<b>D</b>	<i>[If yes, please provide]</i>				
	System airflow vs pressure curve available [y/n]	<b>D</b>	<i>[If yes, please provide]</i>				